

### REMARKS

Claims 1-4, 6-11, 13-18, 20-25, 27-32, 34-38, 40-47, and 49-50 stand rejected on prior art grounds. Applicants respectfully traverse these rejections based on the following discussion. Claims 51-57 are newly added. Thus, claims 1-4, 6-11, 13-18, 20-25, 27-32, 34-38, 40-47, and 49-57 are all the claims presently pending in the application. rejections based on the following discussion.

**I. Request for Withdraw of Final Rejection MPEP §706.07(d).**

The Applicants respectfully request withdrawal of the final rejection because the Examiner, in the Final Office Action dated March 6, 2006, has failed to establish a prima facie case of anticipation as required under 35 U.S.C. 102(b) and MPEP §2131. That is, a prima facie case of anticipation is established only "if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference" (see *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). Specifically, the rejection of the independent claims 1, 9, 16, 23, 30, 37 and 44 fails to establish that both the "defining" process and the "inserting" processes are disclosed. The rejection cites col. 2, lines 65-67 and col. 8, lines 37-40 of Reiner as disclosing the feature of "defining virtual constructs". The rejection cites col. 9, lines 12-13 and 27-28 of Reiner as disclosing the feature of "inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals." However, col. 2, lines 65-67, col. 8, lines 37-40 and col. 9, lines 12-13 and 27-28 each describe the exact same feature of Reiner in which multiple subqueries

are generated from a query. Each of the multiple queries is identical to the original query but includes a "predicate" that limits the subquery to accessing data from a specific partition in the database table. Since a prima facie case of anticipation is only established "if **each and every element** as set forth in the claim is found" and since the "defining" and "inserting" features of the present invention are distinct features, prima facie anticipation is necessarily not established because the same exact feature of Reiner of "generating subqueries" is cited in the Office Action as disclosing both the "defining" and "inserting" features of the present invention.

## II. The Prior Art Rejections

Claims 1-4, 6, 8-11, 13, 15-18, 20, 22-25, 27, 29, 30-32, 34, 36-38, 40-41, 43-47, and 50 stand rejected under 35 U.S.C. §102(b) as being anticipated by Reiner, et al., (U.S. Patent No. 6,289,334 B1), hereinafter referred to as Reiner. Claims 7, 14, 21, 28, 35, 42, and 49 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Reiner, in view of Jagadish, et al. (U.S. Patent No. 7,010,522 B1), hereinafter referred to as Jagadish. Applicants respectfully traverse these rejections because the cited prior art references do not teach or suggest several of the same or similar patentable features of amended independent claims 1, 9, 16, 23, 30, 37 and 44, including the following: (1) "defining groups of virtual construct intervals, wherein said virtual construct intervals represent predetermined ranges of data values and correspond to specific bit positions in bit map vectors;" and (2) "inserting each of said predicate intervals into said bit map positions of at least one of said groups of said virtual construct intervals such that said

specified ranges of data values of said predicate intervals are aligned with said predetermined ranges of said data values of said virtual construct intervals”.

More particularly, col. 2, line 55-col. 4, line 60, of Reiner teaches an improved system for queries regarding data records that are stored in a database table that is contained among multiple independently accessible partitions. The improvement is characterized by an interface that intercepts queries and generates multiple sub-queries from the intercepted queries. The sub-queries each include a limitation for retrieval of data from a corresponding one of the database table partitions. That is, each sub-query is identical to the original query but contains an additional “intersecting predicate” that indicates that the data should be retrieved from a specific partition. Another improvement of the invention includes an indexing element that indexes each of the stored data records in accord with a respective value of that data record. This improvement is characterized by a scatter cluster retrieval element that responds to a request for accessing a data record previously stored via a hashing element, by invoking the an indexing element with respect to the same fields (columns) used by the hashing element.

The present invention is a method and system for maintaining and using a query index, where each query in the query index has a predicate interval. As disclosed in paragraph [0005], these predicate intervals represent the range of data values that a user is interested in and that are specified in the query. These predicate intervals are used to index the query. As discussed in paragraphs [0029-0031] and illustrated particularly in the Figures, this is accomplished by defining groups of virtual construct intervals (VCI)

and inserting the predicate intervals the virtual construct intervals. That is, each VCI is defined so that it represents a predetermined range of data values and corresponds to specified bit map positions in bitmap vectors. Each VCI in a group has the same starting data value, but different end data values. The VCI's within each group overlap. Additionally, VCIs between the groups may overlap. Various other defined features of the VCIs and the groups of VCIs are disclosed in the specification and set out in the claims. Then, when a query (or subscription or rule, etc.) is received, its predicate interval is determined and is inserted into the bit map positions of the VCI to which it aligns (i.e., for which it has the same data values).

Reiner does not address indexing of queries by predicate intervals, much less indexing them by inserting predicate *intervals* that represent the specified ranges of data values from each query into the bit map positions of virtual construct intervals that represent predetermined ranges of data values.

Specifically, Reiner does not teach the same or similar feature of amended independent claims 1, 9, 16, 23, 30, 37 and 44, of "defining groups of virtual construct intervals, wherein said virtual construct intervals represent predetermined ranges of data values and correspond to specific bit positions in bit map vectors". The Office Action cites col. 2, lines 65-67 and col. 8, lines 37-40 of Reiner as disclosing the feature of "defining groups of virtual construct intervals". The Applicants respectfully disagree. Col. 2, lines 65-67 state "A decomposition element within the parallel interface generates multiple subqueries from the intercepted query." Col. 8, lines 37-40 state that "but for a decomposable query it generates a set of subqueries, each of which is based on the initial

query but which is directed to data in one or more respective of the partitions". That is, the cited portions of Reiner refer to the fact that as each query is received it is divided into subqueries that are identical to the original query but include the addition predicate that limits it to a specific partition of the database table. Thus, the system process multiple subqueries to account for the table partitions instead of a single query. These sub-queries do not amount to VCIs, which as clarified in the amended independent claims, represent predetermined ranges of data values and correspond to specific bit positions in bit map vectors.

Reiner also does not teach the same or similar feature of amended independent claims 1, 9, 16, 23, 30, 37 and 44, of "inserting each of said predicate intervals into said bit map positions of at least one of said groups of said virtual construct intervals such that said specified ranges of data values of said predicate intervals are aligned with said predetermined ranges of said data values of said virtual construct intervals". The Office Action cites col. 9, lines 12-13 and 27-28 of Reiner as teaching "inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals". The Applicants respectfully disagree. Col. 9, lines 9-13 state "the decomposer 74A generates corresponding subqueries by duplicating the query and appending a predicate for matching records in the corresponding table partition." Col. 9, lines 15-20 reflect an exemplary original query and col. 9, lines 24-29 reflect an exemplary one of the subqueries that refers to a particular data partition and is derived from the original query. The exemplary original query of col. 9, lines 15-20 does not include a predicate interval (i.e., a specified range of data values). The "predicate" that is referred to in col. 9, lines

9-13 refers to a condition that will be set on the subsequently formed sub-queries so that it is limited to retrieving data from a specific partition. Thus, at best what is described is inserting a predicate partition into a query, not inserting a predicate interval into a virtual construct interval.

Furthermore, as mentioned above, col. 9, lines 12-13 and 27-28 of Reiner describe in detail the exact same feature of Reiner that is summarized in col. 2, lines 65-67 and col. 8, lines 37-40 and that the Examiner has previously cited as disclosing the feature of "defining groups of virtual construct intervals." The "defining" and "inserting" of the present invention are distinct patentable features and, thus, the same exact feature of Reiner can not disclose both of the patentable features of the present invention.

Therefore, amended independent claims 1, 9, 16, 23, 30, 37 and 44 are patentable over Mathew. Further, dependent claims 2-4, 6-8, 10-11, 13-15, 17-18, 20-22, 24-25, 27-29, 31-32, 34-36, 38, 40-43, 45-47, 49-57 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings, and no new matter is being added. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

## II. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 1-4, 6-11, 13-18, 20-25, 27-32, 34-38, 40-47, and 49-57, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 50-0510.

Respectfully submitted,

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